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2                                   **ABSTRACT**  
3                   A ceramic fuel cell(s) is supported in a heat  
4   conductive interconnect plate, and a plurality of plates  
5   form a conductive heater named a stack. Connecting a  
6   plurality of stacks forms a stick of fuel cells. By  
7   connecting a plurality of sticks end to end, a string of  
8   fuel cells is formed. The length of the string can be one  
9   thousand feet or more, sized to penetrate an underground  
10  resource layer, for example of oil. A pre-heater brings the  
11  string to an operating temperature exceeding 700° C., and  
12  then the fuel cells maintain that temperature via a  
13  plurality of conduits feeding the fuel cells fuel and an  
14  oxidant, and transferring exhaust gases to a planetary  
15  surface. A manifold can be used between the string and the  
16  planetary surface to continue the plurality of conduits and  
17  act as a heat exchanger between exhaust gases and  
18  oxidants/fuel.

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